PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

PERMIT SUMMARY

January 22, 2013

Source ID Number: 1890231

Source Name: Abengoa Bioenergy Biomass of Kansas, LLC

Source Location: Township 33 South, Range 37 West, Section 18
Hugoton, Stevens County, Kansas

I. Area Designation

K.A.R. 28-19-350, et seq., Prevention of Significant Deterioration of Air Quality (PSD), affects new major sources and major modifications to major sources in areas designated as "attainment" or "unclassifiable" under section 107 of the Clean Air Act (CAA) for any criteria pollutant. Stevens County, Kansas is an attainment/unclassifiable area for all the criteria pollutants.

II. Project Description

On September 16, 2011, Abengoa Bioenergy Biomass of Kansas, LLC (ABBK) was issued a Prevention of Significant Deterioration (PSD) air quality permit for a biomass to ethanol and biomass-to-energy production facility near Hugoton, Kansas. This permit was based on an air quality impact analysis (AQIA) and a Best Available Control Technology (BACT) determination. The biomass to ethanol manufacturing component of the facility will employ an enzymatic hydrolysis alcohol production process and will utilize cellulosic feedstock (e.g. biomass). The biomass to energy cogeneration component of the facility will consist of one (1) steam turbine electrical generator nominally rated up to a total of 22 Megawatts that will supply all of the electrical power requirements of ABBK. Steam will be generated to run the steam turbine from one (1) water-cooled vibrating grate biomass-fired stoker boiler rated at 500 million British Thermal Units per hour (MMBtu/hr) maximum design heating input.

The September 16, 2011 permit is being appended to include the installation of four identical emergency generator engines. ABBK has determined that four (4) natural gas fired spark ignition emergency engines, connected to corresponding electrical power generators, will be required to support the steam turbine generator and auxiliary utility support systems during boiler start-up, shutdown and malfunction events. The emergency power generators will produce electrical power for critical equipment when biomass-fired boiler power operation is interrupted.

III. Significant Applicable Air Emission Regulations

This proposed source will be subject to Kansas Administrative Regulations relating to air pollution control. The application for this permit was reviewed and will be evaluated for compliance with the following applicable regulations:

A. K.A.R. 28-19-11 Exceptions Due to Breakdown or Scheduled Maintenance – as applied to K.A.R. 28-19-650

B. K.A.R. 28-19-300, Construction Permits and Approvals; Applicability

C. K.A.R. 28-19-302(a), Construction permits and approvals; additional provisions; construction permits.

D. K.A.R. 28-19-350, Prevention of significant deterioration of air quality

E. K.A.R. 28-19-650, Emission Opacity Limitations

F. K.A.R. 28-19-720, Adopting by Reference 40 CFR Part 60, Subpart A, General Provisions.

G. 40 CFR Part 60, Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.

H. 40 CFR Part 63, Subpart A, General Provisions.

I. 40 CFR Part 63, Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.

IV. Air Emissions From the Project

ABBK falls under the 250 ton source category in 40 CFR Part 52.21, therefore the 250 ton threshold is used to determine if a new source is subject to the requirements of 40 CFR Part 52.21.

The potential-to-emit from the September 16, 2011 permitted biomass facility and the proposed four emergency generator engines are listed in Table 1. The potential-to-emit (PTE) of Oxides of Nitrogen (NO_x), Sulfur Dioxide (SO_2), Carbon Monoxide (CO), Carbon Dioxide equivalents (CO_2e), Particulate Matter (PM), PM less than 10 microns (PM_{10}), PM less than 2.5 microns ($PM_{2.5}$), Ozone (O_3), Hydrogen Sulfide (H_2S), Hazardous Air Pollutants (HAPs) and Volatile Organic Compounds (VOCs) were compared with the Significant Emission Rates for PSD applicability for the criteria and non-criteria pollutants. ABBK is a new major source that has the potential to emit greater than 100,000 tons per year of Greenhouse Gas (GHG) on a CO_2e basis. Therefore the facility is a major source for PSD purposes. In addition the PTE of NO_X, CO, SO_2, VOC, PM, PM_{10}, and $PM_{2.5}$ are above the PSD significance levels and will be reviewed under the PSD regulations. Since NO_x emissions for the proposed project are significant, pursuant to 40 CFR Part 52.21, emissions for Ozone (O_3) are also considered significant. Since NO_x is a surrogate for O_3, NO_x emission rates and controls will be representative as emission rates and controls for O_3.

The four emergency generator engines are subject to BACT for air emissions of NO_x, CO, SO_2, VOC, PM, PM_{10}, $PM_{2.5}$ and CO_2e. An AQIA, BACT determination, and additional impacts upon soils, vegetation and visibility were conducted as a part of this appended permit application process.

Table 1 - Air Emissions Estimates from the Proposed Activity

POLLUTANT	Potential to Emit[1] Emissions (tons per year)			
	Pre-September 16, 2011 Permit	**Post-September 16, 2011 Permit**	**Emission Increase due to Four Emergency Engine Gen-Sets***	**Total Facility Emissions (September 16, 2011 Permit Plus Four Emergency Gen-sets)**
PM	> 250	130.5	0.013	130.5
PM_{10}	> 250	118.6	0.013	118.6
$PM_{2.5}$	> 250	77.0	0.013	77.0
NO_x	> 250	668.5	0.96	669.5
CO	> 250	519.5	3.12	522.6
SO_2	> 250	483.4	0.00074	483.4
VOC	> 250	29.1	0.15	29.3
Lead	0.11	0.11	0	0.11
Sulfuric Acid (H_2SO_4)	67.7	3.0	0	3.0
Hydrogen Chloride (HCl)	569.5	5.7	0	5.7
Hydrogen Fluoride (HF)	0.66	0.01	0	0.01
CO_2e	> 100,000	590,297	147	590,444
Total HAPs	> 25	20.2	0.09	20.3
Largest Single HAP (HCl)	> 10	5.7	0	5.7

* Maintenance checks and readiness testing for each engine shall be limited to 100 hours per year

[1] Potential-to-emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable.

V. Best Available Control Technology (BACT)

The BACT requirement applies to new affected emissions units and pollutant emitting activity. Individual BACT determinations are performed for each pollutant emitted from the same emission unit. Consequently, the BACT determination must separately address, for each regulated pollutant with a significant emissions increase at the source, air pollution controls for each missions unit or pollutant emitting activity subject to review. ABBK was required to prepare a BACT analysis for KDHE's review according to the process described in Attachment A of this permit summary. KDHE's evaluation of the BACT for ABBK is presented in Attachment B.

Table 2 - ABBK Emission Units and Pollutants Subject to BACT

Emission Unit	Pollutants Subject to BACT Review
Cummins Power Generation model C1750 N6C natural gas fired, 4 cycle lean burn reciprocating generator engine, rated at 2,463 bhp; designated as EP-20010	NO_x[2] CO VOC
Cummins Power Generation model C1750 N6C natural gas fired, 4 cycle lean burn reciprocating generator engine, rated at 2,463 bhp; designated as EP-20020	SO_2 CO_2e PM
Cummins Power Generation model C1750 N6C natural gas fired, 4 cycle lean burn reciprocating generator engine, rated at 2,463 bhp; designated as EP-20030	PM_{10} $PM_{2.5}$
Cummins Power Generation model C1750 N6C natural gas fired, 4 cycle lean burn reciprocating generator engine, rated at 2,463 bhp; designated as EP-20040	

KDHE has concurred with ABBK for the following BACT emission limits and operational conditions:

A. Four (4) identical Cummins Power Generation Model C1750 N6C natural gas fired, 4 cycle lean burn, rated at 2,463 bhp, emergency reciprocating engine generator sets (EP-20010, 20020, 20030 and 20040):

1. BACT emission limitation for NO_x per engine is 0.882 g/bhp-hr, including periods of startup, shutdown, and malfunction. The NO_X emissions from each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set shall be controlled with good combustion practices. The owner or operator shall be limited to firing pipeline quality natural gas only in the engines. The owner or operator shall operate and maintain the engines per recommendations of the manufacturer to assure proper and

[2] NOx emissions for the project exceed the 40 tons significance threshold, therefore pursuant to 40 CFR 52.21, the project is also significant for O_3. Since NO_x is a surrogate for O_3, BACT for NOx will be considered BACT for O_3.

effective operation. Due to the identical engine specifications and emission rates of the four engines, the owner shall be required to perform initial performance testing on one engine.

2. BACT emission limitation for CO per engine is 2.87 g/bhp-hr, including periods of startup, shutdown, and malfunction. The CO emissions from each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set shall be controlled with good combustion practices. The owner or operator will be limited to firing pipeline quality natural gas only in the engines. The owner or operator shall operate and maintain the engines per recommendations of the manufacturer to assure proper and effective operation. Due to the identical engine specifications and emission rates of the four engines, the owner will be required to perform initial performance testing on one engine.

3. BACT emission limitation for $PM/PM_{10}/PM_{2.5}$ per engine is 0.063 lb/hr including periods of startup, shutdown, and malfunction. The $PM/PM_{10}/PM_{2.5}$ emissions from each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set shall be controlled with good combustion practices. The owner or operator shall be limited to firing pipeline quality natural gas only in the engines. The owner or operator shall operate and maintain the engines per recommendations of the manufacturer to assure proper and effective operation. Due to the identical engine specifications and emission rates of the four engines, the owner shall be required to perform initial performance testing on one engine.

4. BACT emission limitation for VOC per engine is 0.136 g/bhp-hr, including periods of startup, shutdown, and malfunction. The VOC emissions from each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set shall be controlled with good combustion practices. The owner or operator will be limited to firing pipeline quality natural gas only in the engines. The owner or operator shall operate and maintain the engines per recommendations of the manufacturer to assure proper and effective operation. Due to the identical engine specifications and emission rates of the four engines, the owner will be required to perform initial performance testing on one engine.

5. BACT emission limitation for SO_2 per engine is 0.0037 lb/hr including periods of startup, shutdown, and malfunction. The SO_2 emissions from each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set shall be controlled with good combustion practices. The owner or operator shall be limited to firing pipeline quality natural gas only in the engines. The owner or operator shall operate and maintain the engines per recommendations of the manufacturer to assure proper and

effective operation. Due to the identical engine specifications and emission rates of the four engines, the owner shall be required to perform initial performance testing on one engine.

6. BACT emission limitation for CO_2e per engine is 117.0 lb per MMBtu including periods of startup, shutdown, and malfunction. The BACT limit for each engine is 36.7 tons of CO_2e per any consecutive 12 month period. The CO_2e emissions from the four identical Cummins Power Generation Model C1750 N6C Natural Gas Reciprocating Engine Generator Sets shall be controlled with good combustion practices. The owner or operator will be limited to firing pipeline quality natural gas only in the emergency engines. Due to the identical engine specifications and emission rates of the four engines, the owner shall be required to perform initial performance testing on one engine. The owner or operator will be required to track fuel fired in each engine and calculate a monthly and twelve month rolling average to compare with the limit.

7. Each emergency engine generator may be operated for the purpose of maintenance checks and readiness testing, provided that the tests are recommended by Federal, State or local government, the manufacturer, the vendor, or the insurance company associated with the engine. Maintenance checks and readiness testing for each engine is limited to 100 hours per year.

8. Maintenance and testing hours of operation, except for necessary operational demonstrations to prove completion of maintenance, shall occur between 9:00 AM and 6:00 PM, Monday through Friday.

VI. Ambient Air Impact Analysis

The owner or operator of a proposed source or modification must demonstrate that allowable emission increases from the proposed source, in conjunction with all other applicable emissions increases or reductions, would not cause or contribute to air pollution in violation of:

1. any national ambient air quality standard (NAAQS) in any air quality control region; or

2. any applicable maximum allowable increase over the baseline concentration in any area.

The AERMOD modeling system Version 12060 was used to determine the maximum predicted ground-level concentration for each pollutant and applicable averaging period.

Per the modeling protocol, ABBK modeled the following pollutants and averaging times: 3-hour SO_2, 24-hour SO_2, 1-hour CO, 8-hour CO, 24-hour $PM_{2.5}$, and 24-hour PM_{10}. The screening modeling indicated the Significant Impact Level (SIL) was exceeded for 24-hour SO_2, 24-hour $PM_{2.5}$, and 24-hour PM_{10}. Therefore, refined modeling was conducted for these pollutants and averaging periods.

For details on dispersion modeling of proposed project, refer to the following modeling report submitted by ABBK: ***Air Dispersion Modeling Supplement in Support of Prevention of Significant Deterioration Air Construction Permit Application Source ID No. 1890231*** dated October, 2012. Sections 5 and 6 and Appendix C of the modeling report present the ABBK's modeled results. An additional supplement was submitted on December 12, 2012.

KDHE conducted modeling runs for the 24-hour $PM_{2.5}$ to verify ABBK's modeled results. The PSD increment and National Ambient Air Quality Standards (NAAQS) modeling results for 24-hour $PM_{2.5}$, as shown in Table 15 of Appendix C of the modeling report, showed considerable discrepancy between the "Sept 16, 2011 AQIA results" and the "October 2012 AQIA modification results". KDHE modeling runs used the same modeling input parameters used by ABBK for both on-site and off-site (nearby) emission sources. KDHE used the center of the facility specified in the modeling report (i.e., Easting: 288,351.05 meters, Northing: 4,117,494.00 meters), which is about 100 meters different from the x-coordinate actually used by ABBK in their modeling runs.

As a response to KDHE's need for clarification of the "October 2012" modeling results and KDHE's request to re-run the cumulative modeling for 24-hour PM2.5, ABBK sent a letter report dated December 12, 2012 with the following subject: ***"Additional PM2.5 Model Analyses to Support October 2012 Modification Application for Abengoa Biomass of Kansas, LLC, Prevention of Significant Deterioration Air Construction Permit Application Source ID No. 189023"***.

ABBK summarized the modeled results in the December 2012 modeling runs on Table 4 of the letter report dated December 12, 2012. Tables 1 through 3 at the end of this memo show the 24-hour $PM_{2.5}$ modeled results of KDHE and ABBK.

ABBK summarized in Table 6-8 of the modeling report dated October 2012 the increment consumption for the ABBK facility including the proposed changes:

- 12.22% of the 24-hour Class II maximum allowable increments for SO_2 are expected to be consumed.
- 96.56% of the 24-hour $PM_{2.5}$ Class II maximum allowable increment for $PM_{2.5}$ is expected to be consumed.
- 96.27% of the 24-hour PM_{10} Class II maximum allowable increments for PM_{10} are expected to be consumed.

ABBK concludes that the modeled results of the previously modeled ABBK facility including the proposed project changes will not cause or contribute to any violations of applicable NAAQS and PSD Class II area increment. KDHE concurs with ABBK's conclusion.

VII. Additional Impacts Analysis

For the PSD permit that was issued September 16, 2011, the facility provided an analysis of the impairment to visibility, and impacts on plants, soils and, vegetation that would occur as a result of the project and to what extent the emissions from the proposed modification impacts the general commercial, residential, industrial and other growth. No change in this analysis is expected to occur as a result of this proposed permit modification.

VIII. Key Steps in the 'Top-Down' BACT Analysis

The four steps in the 'Top-Down' BACT Analysis are presented in Attachment A.

IX. BACT Analysis for PSD Permit

KDHE's evaluation of the BACT submitted by ABBK for the proposed addition of four natural gas fired spark ignition emergency engines is presented in Attachment B

Attachment A

KEY STEPS IN THE "TOP-DOWN" BACT ANALYSIS

STEP 1: **IDENTIFY ALL POTENTIAL AVAILABLE CONTROL TECHNOLOGIES.**

The first step in a "Top-Down" analysis is to identify, for the emission unit in question, "all available" control options. Available control options are those air pollution control technologies or techniques with a PRACTICAL POTENTIAL FOR APPLICATION to the emissions unit and the regulated pollutant under review. This includes technologies employed outside of the United States. Air pollution control technologies and techniques include the application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of the affected pollutant.

STEP 2: **ELIMINATE TECHNICALLY INFEASIBLE OPTIONS.**

The technical feasibility of the control options identified in Step 1 is evaluated with respect to the source-specific (or emissions unit specific) factors. In general, a demonstration of technical infeasibility should be clearly documented and should show, based on physical, chemical, and engineering principles, that difficulties would preclude the successful use of the control option on the emissions unit under review. Technically infeasible control options are then eliminated from further consideration in the BACT analysis.

STEP 3: **RANK REMAINING CONTROL TECHNOLOGIES BY CONTROL EFFECTIVENESS.**

All remaining control alternatives not eliminated in Step 2 are ranked and then listed in order of over-all control effectiveness for the pollutant under review, with the most effective control alternative at the top. A list should be prepared for each pollutant and for each emissions unit subject to a BACT analysis.

The list should present the array of control technology alternatives and should include the following types of information:

1) control efficiencies;

2) expected emission rate;

3) expected emission reduction;

4) environmental impacts;

5) energy impacts; and

6) economic impacts.

STEP 4: **EVALUATE MOST EFFECTIVE CONTROLS AND DOCUMENT RESULTS**.

The applicant presents the analysis of the associated impacts of the control option in the listing. For each option, the applicant is responsible for presenting an objective evaluation of each impact. Both beneficial and adverse impacts should be discussed and, where possible, quantified. In general, the BACT analysis should focus on the direct impact of the control alternative. The applicant proceeds to consider whether impacts of unregulated air pollutants or impacts in other media would justify selection of an alternative control option. In the event the top candidate is shown to be inappropriate, due to energy, environmental, or economic impacts, the rationale for this finding should be fully documented for the public record. Then the next most stringent alternative in the listing becomes the new control candidate and is similarly evaluated. This process continues until the technology cannot be eliminated.

STEP 5: **SELECT BACT**.

The most effective control option not eliminated in Step 4 is proposed as BACT for the emission unit to control the pollutant under review.

Attachment B

KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT'S EVALUATION OF THE PROPOSED BACT SUBMITTED BY ABBK FOR THE ADDITION OF FOUR NATURAL GAS FIRED SPARK IGNITION EMERGENCY ENGINES

PROPOSED BACT OPTIONS

ABBK conducted a BACT analysis to determine the appropriate control of emissions from the proposed addition of four natural gas fired spark ignition emergency engines. The facility addition will consist of the following emissions sources: four (4) identical Cummins Power Generation model C1750 N6C natural gas fired, 4 cycle lean burn reciprocating engine generator sets for emergency power requirements, each rated at 2,463 brake horse power (bhp).

The proposed operating scenario for each Cummins Power Generation model C1750 N6C engine includes operating at 100% load capacity. Maintenance checks and readiness testing for each engine is limited to 100 hours per year.

The following represents the KDHE's evaluation of the proposed BACT submitted by ABBK supported by a summary of the analysis done for each control option. Please refer to the *Abengoa Bioenergy Biomass of Kansas, LLC Prevention of Significant Deterioration Air Quality Construction Permit Modification Application* dated October 2012 for a more thorough evaluation of possible BACT.

I. BACT Analysis for NO_x, CO, VOC, SO_2 and $PM/PM_{10}/PM_{2.5}$

A. Cummins Power Generation model C1750 N6C Natural Gas Reciprocating Engine Generator Sets

1. NO_x BACT

Two types of NO_x control techniques have been identified as possible controls to the Cummins Power Generation Engines:

- Selective Catalytic Reduction (SCR)
- Three-Way Catalyst (reduces NO_x, CO and VOCs)

The three-way catalyst is not feasible on the oxygen-rich exhaust from a lean-burn engine.

SCR has been demonstrated in the ABBK BACT analysis to be too expensive for an emergency service engine.

Vendor specifications for the Cummins Power Generation model C1750 N6C Natural Gas Reciprocating Engine have shown that the proposed low-emission lean burn engine will reduce NO_x emissions to 0.882 g/hp-hr. Therefore, burning only natural gas in a low-emission lean-burn RICE and good combustion practice is BACT for NO_x for the Cummins Power Generation Engines. BACT emission limitation for NO_x per engine is 0.882 g/bhp-hr, including periods of startup, shutdown, and malfunction.

2. CO BACT

Two types of CO control techniques have been identified as possible controls to the Cummins Power Generation Engines:

- Three-Way Catalyst (reduces NO_x, CO and VOCs)
- Oxidation Catalyst

The three-way catalyst is not feasible on the oxygen-rich exhaust from a lean-burn engine.

Oxidation catalyst has been demonstrated in the ABBK BACT analysis to be too expensive for an emergency service engine.

Therefore, burning only natural gas and good combustion practice is BACT for CO for the Cummins Power Generation Engines. BACT emission limitation for CO per engine is 2.87 g/bhp-hr, including periods of startup, shutdown, and malfunction.

3. VOC BACT

One type of VOC control technique has been identified as applicable to the Cummins Power Generation Engines:

- Three-Way Catalyst (reduces NO_x, CO and VOCs)

The three-way catalyst is not feasible on the oxygen-rich exhaust from a lean-burn engine.

Therefore, burning only natural gas and good combustion practice is BACT for VOC for the Cummins Power Generation Engines. BACT emission limitation for VOC per engine is 0.136 g/bhp-hr, including periods of startup, shutdown, and malfunction.

4. SO_2 BACT

Inherently low emissions of SO_2 result from natural gas combustion in lean-burn engines. Therefore, burning only natural gas in a lean-burn

RICE and good combustion practice is BACT for SO_2 for the Cummins Power Generation Engines. BACT emission limitation for SO_2 per engine is 0.0037 lb/hr including periods of startup, shutdown, and malfunction.

5. $PM/PM_{10}/PM_{2.5}$ BACT

Inherently low emissions of $PM/PM_{10}/PM_{2.5}$ result from natural gas combustion due to high combustion efficiencies and the clean-burning nature of natural gas. Therefore, burning only natural gas in a lean-burn RICE and good combustion practice is BACT for $PM/PM_{10}/PM_{2.5}$ for the Cummins Power Generation Engines. BACT emission limitation for $PM/PM_{10}/PM_{2.5}$ per engine is 0.063 lb/hr including periods of startup, shutdown, and malfunction.

II. BACT Analysis for Carbon Dioxide Equivalents - Greenhouse Gas (CO_2e – GHG)

In accordance with the GHG Tailoring Rule effective July 1, 2011, new stationary sources emitting greater than 100,000 tons per year of CO_2e are subject to PSD requirements and BACT review in accordance with 40 CFR Part 52.21.

A. Greenhouse Gas (CO_2e – GHG) BACT Analysis for Cummins Power Generation Natural Gas Reciprocating Engine Generator Sets

Four types of control techniques have been identified as applicable to the combustion reciprocating engines:

- Carbon Capture and Sequestration/Storage (CCS)
- Selecting higher energy efficient engine generators
- Efficient process controls and practices
- Low carbon fuel selection

1. CCS

Carbon Capture and Sequestration/Storage (CCS) is the only potential add-on technology available and incorporates capturing CO_2 emissions, transporting the CO_2, generally via pipeline, and injecting the CO_2 into subsurface geological formations.

A cost analysis was performed for the September 16, 2011 PSD construction permit and the total capital cost for capture technology was cost prohibitive and therefore CCS was economically infeasible for use at the ABBK facility.

2. Selecting higher energy efficient engine generators; Efficient process controls and practices; and Low carbon fuel selection

ABBK is proposing to install four (4) Cummins Power Generation model C1750 N6C reciprocating IC engines for emergency electricity generation. These units were chosen for their generator efficiency, output power and reliability. These units will be maintained using good combustion practices and manufacturer recommended maintenance in order to promote combustion efficiency and engine life and will burn only pipeline quality natural gas to minimize the combustion of hydrocarbons. Therefore, firing pipeline quality natural gas, good combustion practices and efficient process controls and practices is BACT for the Cummins Power Generation engines.

The BACT GHG Emission rates for each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set are:

117.0 lbs of CO_2/MMScf of Natural Gas Fired
0.0022 lbs of CH_4/MMScf of Natural Gas Fired
0.00022 lbs of N_2O/MMScf of Natural Gas Fired
117.0 lbs of CO_2e/ MMScf of Natural Gas Fired

The BACT GHG Emission Limits for each Cummins Power Generation Natural Gas Reciprocating Engine Generator Set are:

36.7 tons of CO_2/any consecutive 12 month period
0.0007 tons of CH_4/any consecutive 12 month period
0.00007 tons of N_2O/any consecutive 12 month period
36.7 tons of CO_2e/any consecutive 12 month period